

Applicant : William Suttle Peters, et al.
Appl. No. : 10/634,642
Examiner : Alyssa M. Alter
Docket No. : 13634.4003

IN THE CLAIMS:

Please amend the claims as shown below.

Please add new claim 31 and 32.

1. (Currently Amended) A heart assist device comprising:

an intraluminal inflatable counter-pulsation balloon, or chamber which can be moved between an inflated condition and a deflated condition; and

said balloon or chamber being attached to a non-expandable shell which is adapted to hold it in place adjacent to~~against~~ the inside surface of ~~an inner~~ wall of an arterial vessel, such that, in the deflated condition, substantially the whole of the balloon or chamber lies closely adjacent to said wall and, in the inflated condition, the balloon or chamber projects into said vessel from said wall.
2. (Currently Amended) The heart assist device as claimed in claim 1, wherein the balloon or chamber is coupled~~attached~~ to a stent having an expandable frame.
3. (Currently Amended) The heart assist device as claimed in claim 2, wherein the counter-pulsation balloon or chamber is attached to a portion of the~~an~~ inner wall of the frame.
4. (Original) The heart assist device as claimed in claim 2, wherein the frame of the stent is self expanding.
5. (Original) The heart assist device as claimed in claim 4, wherein the frame is formed of a spring material.
6. (Original) The heart assist device as claimed in claim 2, wherein the frame is formed of a shape memory alloy.
7. (Original) The heart assist device as claimed in claim 2, wherein the frame is balloon or chamber expandable.

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8. (Currently Amended) The heart assist device as claimed in claim 2, wherein the stent, together with~~including~~ the balloon or chamber coupled thereto, is packaged into a catheter delivery structure which can be introduced into a suitable artery.

9. (Original) The heart assist device as claimed in claim 2, wherein the frame of the stent is formed of wires.

10. (Original) The heart assist device as claimed in claim 9, wherein the frame is covered with a fabric.

11. (Original) The heart assist device as claimed in claim 9, wherein the frame has a coating around its periphery on either the outside or the inside of the frame.

12. (Original) The heart assist device as claimed in claim 9, wherein the wires of the stent frame are bare adjacent any vessels branching off from a vessel into which the stent is placed.

13. (Currently Amended) The heart assist device as claimed in claim 2, wherein the frame defines a lumen and the balloon or chamber extends around the full circumference of the lumen of the frame, such that there is substantially no space between them.

14. (Currently Amended) The heart assist device as claimed in claim 2, wherein the frame defines a lumen and the balloon or chamber does not extends around ~~a part of the~~ full circumference of the lumen of the frame, but only a portion thereof.

15. (Original) The heart assist device as claimed in claim 14, wherein the part of the stent over which the balloon or chamber does not extend are formed as a bare stent so that any branch vessels diverging from the artery in which the stent is positioned will not be occluded.

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16. (Currently Amended) The heart assist device as claimed in claim 1, further including a fluid conducting tube communicating with the interior of~~connected to~~ the balloon or chamber.

17. (Currently Amended) The heart assist device as claimed in claim 16~~2~~, further including a fluid pressure source connected to the balloon or chamber via the fluid conducting tube, the fluid pressure source adapted to cause the inflatable balloon or chamber to be expanded and contracted in counter-pulsation with the heart of a patient into whom the balloon or chamber has been placed.

18. (Cancelled) The heart assist device as claimed in claim 17, wherein the stent is placed intraluminally and then connected to the fluid pressure source by forming an aperture in the wall of the aorta or other artery and connecting the fluid conducting tube from the fluid pressure source to the balloon or chamber via the aperture.

19. (Previously Presented) The heart assist device as claimed in claim 17, wherein the fluid conducting tube is a gas carrying tube which is adapted to exit the body percutaneously.

20. (Currently Amended) The method as claimed in claim 26, wherein the fluid~~gas~~ carrying tube is connected to a port on the stent thoracoscopically.

21. (Previously Presented) The method as claimed in claim 23, wherein the stent is placed intraluminally and then connected to a fluid pressure source placed in the right chest through a sternotomy.

22. (Currently Amended) The method as claimed in claim 26,~~;~~ further including a liquid carrying tube is connected through an aortotomy to a port on the shell~~stent~~ which is in communication with the interior of the balloon or chamber.

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23. (Currently Amended) A method of assisting the functioning of a heart of a patient, the method including the steps of:

holding a shell having a heart assist device attached thereto, said heart assist device comprising an intraluminal inflatable counter-pulsation balloon, or chamber, in place against the inner surface of a wall of an arterial vessel of the patient;

connecting the inflatable balloon or chamber to a fluid pressure source;

energizing the fluid pressure source to expand said balloon or chamber away from the wall of said shell and to contract the inflatable balloon or chamber such that it is placed adjacent to the inside of the wall of said vessel, such expansion and contraction being in counter-pulsation with the heart of a patient into whom the balloon or chamber has been placed.

24. (Currently Amended) The method as claimed in claim 23, wherein the chamber or balloon is coupled to~~part of~~ a stent comprising an expandable frame and the method includes the step of attaching the counter-pulsation balloon or chamber to the inside wall of the shell~~frame~~.

25. (Currently Amended) The method as claimed in claim 23, wherein the method also includes the step of packaging the stent, together with~~including~~ the balloon or chamber, into a catheter delivery structure and introducing the structure into a suitable artery.

26. (Currently Amended) The method as claimed in claim 23, wherein the method also includes the step of placing the stent intraluminally and then connecting it the balloon or chamber to a fluid pressure source by forming an aperture in the wall of the aorta or other artery and connecting a fluid conducting tube from the fluid pressure source to the balloon or chamber.

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27. (Original) The method as claimed in claim 23 wherein, the method also includes the step of placing the stent intraluminally and then connecting it to a hydraulic driver placed in the right chest through a sternotomy.

28. (Currently Amended) The heart assist device as claimed in claim 1, wherein the balloon or chamber~~said shell is adapted to~~ prevents blood from flowing over the surface of the shell which is adapted to be held against the inner wall of an arterial vessel.

29. (Previously Presented) The heart assist device of claim 1, wherein the balloon or chamber is adapted to lie adjacent to the inner wall of the shell when the balloon or chamber is deflated.

30. (Currently Amended) A heart assist device comprising:
an intraluminal inflatable counterpulsation balloon; or chamber; ~~and~~
said balloon or chamber being attached to a shell which is adapted to be located adjacent to~~hold it in place against~~ the surface of an inner wall of an arterial vessel, said shell having an arcuate cross-section, the interior surface of said balloon or chamber facing the concave surface of said shell, said shell having a port in its wall to permit fluid flow into said balloon or chamber in a direction transverse to the direction of flow of blood through the vessel and said port being connected to a tube.

31. (New) The heart assist device of claim 30 wherein an expandable stent having a lumen is coupled to said balloon or chamber.

32. (New) The heart assist device of claim 31 wherein the balloon or chamber does not extend around the full circumference of the lumen of the stent, but only extend around a part of the circumference of the lumen of the stent.